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EXAMINER

DANIELS, MATTHEW J

ART UNIT

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1791

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/659,006	Applicant(s) BAJOREK, CHRISTOPHER H.	
	Examiner MATTHEW J. DANIELS	Art Unit 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 18, 19 and 22-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18, 19 and 22-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The declaration under 37 CFR 1.132 filed 31 October 2008 is insufficient to overcome the rejection of claim 1 as set forth in the last Office action because: (a) the claims are not commensurate in scope with the evidence submitted, and therefore fail the nexus requirement (See MPEP 716.01(b)), and (b) the attached figure described at page 3 of the declaration appears to be absent (No figures appear to be attached to the declaration). With respect to the nexus requirement, poor results were described at temperatures which were either too high or too low (Second Treves Decl., page 3), but the claims do not recite the range where the unexpected result is found. It is respectfully submitted that the supplemental declaration does not cure this deficiency – the allegedly unexpected result which the declaration appears to set forth is the good embossing and separation without reflow in a particular temperature range. It would appear obvious (and not unexpected) that reflow would occur when an excessively hot mold is opened without cooling. However, the asserted unexpected result is not a defective part which has suffered from reflow, but appears to be a part where reflow is absent. That asserted unexpected result is not found at every temperature above the glass transition temperature, but only at certain temperatures, as admitted by the declaration.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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2. **Claim 25** is rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The temperature range which produces trench and plateau patterns approximately equal to the surface area of the stamper is critical or essential to the practice of the invention, but is not included in the claim. A claim which omits matter disclosed to be essential to the invention as described in the specification or in other statements of record may be rejected under 35 U.S.C. 112, first paragraph, as not enabling. *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). See also MPEP § 2164.08(c). Such essential matter may include missing elements, steps or necessary structural cooperative relationships of elements described by the applicant(s) as necessary to practice the invention. In this case, a particular temperature range is essential to avoid reflow and to obtain a pattern having substantially the same surface area as the stamper. (First Treves Dec., page 3, Second Treves Dec., page 3).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1, 2, 8, and 25** are rejected under 35 U.S.C. 102(b) as being anticipated by Krauss (Ph.D. Dissertation, University of Minnesota, 1997). **As to Claim 1**, Krauss teaches a method, comprising:

heating a stamper and a resist film (page 82, lines 17-21), wherein the stamper is flat (page 80);

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imprinting the stamper into the resist film (pages 82-84);
separating the stamper from the resist film before the resist film is cooled below approximately a glass transition temperature of the resist film (page 83, lines 10-12); and
cooling the resist film below the glass transition temperature after the separating (inherent). **As to Claims 2 and 8**, Krauss provides both the stamper and single resist layer (PMMA) heated to the glass transition temperature (pages 82-83). **As to Claim 25**, since Krauss teaches a temperature range which is the same temperature range as the claimed invention and teaches all other limitations required by instant Claim 1, it would have been inherent that the same result is achieved.

4. **Claims 1-4, 8, 11, 14, 15, 18, and 25** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tan (J. Vac. Sci. Technol. B 16(6) Nov/Dec 1998, pp. 3926-3928). **As to Claim 1**, Tan teaches a method comprising:

heating a stamper and a resist film (page 3927, right col.);
imprinting the stamper into the resist film (Fig. 1, Fig. 2);
separating the stamper from the resist film (Fig. 2);
cooling the resist film after separating (inherent in that the material is subsequently analyzed, Figs. 3-4).

Tan does not expressly teach (a) a stamper that is flat, or (b) “separating the stamper from the resist film before there is any substantial cooling of the resist film”. With respect to (a), it is submitted that the stamper is locally flat in the region which is being imprinted. A compact disk is sufficiently large that even when the Tan disk mold (Fig. 3) is formed into a roll, there would

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be no detectable curvature over the surface area shown in Fig. 3 of Tan. With respect to (b), in view of the fact that the stamper (the roller) operates continuously while being heated by a lamp (Fig. 1) which provides a mold temperature above the glass transition temperature, it would have been inherent that the resist in contact with the stamper would still be at a temperature above its glass transition temperature when the stamper separates from the resist. In the alternative, however, is this limitation would have been prima facie obvious over Tan's teaching to optimize the temperature of both components (stamper and resist) within a wide temperature range (page 3927, left column). Therefore, in the alternative, the stamper (roller) temperature and the resist temperature represent result effective variables that one would optimize to produce high pattern fidelity and good separation.

As to Claim 2, Tan teaches that the temperature is a result effective variable, and that temperature of the platform was varied up to 200 C (page 3927). Since the roller is always above the glass transition temperature (page 3926, right column), the claim is anticipated or obvious over the Tan method. **As to Claims 3, 4, and 8**, see Figs. 5 and 2 for the structures and configurations. **As to Claim 11**, since the stamper (roller) and platform are heated to different temperatures and using different heating means (Fig. 1), they would inherently be separately heated. **As to Claims 14 and 15**, Tan teaches that the stamper (roller) is heated to a first temperature above the glass transition temperature of the resist (page 3926, right column) while the resist is heated on the platform is at a temperature of around 50 C (page 3927, right column). Since the resist is contacted by the stamper (roller) heated at the first temperature, it is submitted that it would have been inherent that the resist would have been further heated to the first temperature. **As to Claim 18**, in view of Tan's teaching in Fig. 5, it would have been inherent

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that the resist film would be deposited before it was heated. Alternatively, one would obviously create a resist film prior to heating it. **As to Claim 25**, Tan teaches producing trenches and plateaus (Fig. 4) having the same or substantially the same surface area as the stamper.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 3, 4, 10, 11, 12 and 13** are rejected under 35 U.S.C. 103(a) as obvious over Krauss (Ph.D. Dissertation, University of Minnesota, 1997). Krauss teaches the subject matter of Claims 1 and 2 above under 35 USC 102(b). **As to Claims 3 and 4**, although Krauss does not expressly teach a wafer or a trench/plateau pattern used with the resist described in the rejection of Claim 1, these aspects of the invention would have been obvious additions to the Krauss process. For example, Krauss teaches a wafer with the resist on page 87 and trenches and plateaus on page 91. As to Claim 10, Krauss teaches heating prior to imprinting (page 82), and any order of heating the two components prior to the imprinting process would have been obvious. **As to Claims 11 and 12**, Krauss teaches heating to the glass transition temperature (pages 82-83). Although Krauss is silent to the number of heating devices, and thus heating the stamper and resist separately, heating the two components separately would merely separate two process steps already disclosed by Krauss. Separation of parts or steps would have been obvious

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to the ordinary artisan practicing the Krauss method. **As to Claim 13**, it is submitted that any step of imprinting would obviously require placement of the stamper in close proximity to the resist in order that it is subsequently imprinted.

6. **Claims 5 and 6** are rejected under 35 U.S.C. 103(a) as obvious over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928) in view of Chou (USPN 5956216). Tan teaches the subject matter of Claims 1 and 11 above under 35 USC 102(b), or in the alternative, under 35 USC 103(a). **As to Claims 5 and 6**, Tan is silent to the removing the resist and disposing a magnetic layer. However, Chou teaches selectively removing the resist film to form a pattern of areas that do not have the resist film thereon (Fig. 4C), and disposing a magnetic layer in the areas that do not have the resist film (Fig. 4D, Item 48). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chou into that of Tan because Tan suggests that the process should be used for data storage devices (Figs. 3 and 4), and Chou provides a process for making a data storage device.

7. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928) in view of Chou (USPN 5956216), and further in view of Chou (USPN 6309580). Tan and Chou ('216) teach the subject matter of Claim 5 above under 35 USC 103(a). **As to Claim 7**, Tan and Chou ('216) appear to be silent to the deliberate etching of the base structure using the patterned resist film. However, Chou ('580) teaches that recesses may be formed in the substrate (Fig. 8 and 10:41-51) using a patterned resist film produced by imprinting (Figs. 1A-1D). It would have been prima facie obvious to one

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of ordinary skill in the art at the time of the invention to incorporate the method of Chou ('580) into that of Tan because Tan suggests the formation of data structures, and because the improvement of Chou ('580) would mechanically secure the deposited material into the substrate, rather than to the surface.

8. **Claims 10, 12, 13, and 16** are rejected under 35 U.S.C. 103(a) as obvious over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928). Tan teaches the subject matter of Claims 1 and 11 above under 35 USC 102(b), or in the alternative, under 35 USC 103(a). **As to Claim 10**, although Tan is silent to a particular order of steps, any order of heating would have been obvious since there would be no material affect on the method by the rearrangement of the order of heating the two components. **As to Claim 13**, in the rolling process of Tan, the stamper (roller) would be placed in closed proximity to the resist while the resist is approximately at the imprint temperature in order that the resist is subsequently imprinted (Figs. 2 and 5). **As to Claims 12 and 16**, Tan optimized the temperature of both components. Since the platform was heated in some cases to 200 C (page 3927, left column), and the stamper was heated to temperatures between 120 and 200 C (page 3927, left column), it would have been obvious to provide temperature combinations such that the stamper and resist are separately heated above the glass transition temperature such that the temperature of the resist is higher than that of the stamper.

9. **Claim 9** is rejected under 35 U.S.C. 103(a) as obvious over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928) in view of Heidari (J. Vac. Sci. Technol. B 18(6),

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Nov/Dec 2000, pp. 3557-3560). Tan teaches the subject matter of Claim 1 above under 35 USC 102(b), or in the alternative, under 35 USC 103(a). **As to Claim 9**, Tan is silent to the plurality of resist layers. Additionally with respect to (b), Heidari teaches a multilayer resist scheme (page 3559) used with nanoimprint lithography and a lift-off process. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Heidari into that of Tan because (a) the references demonstrate that both resist configurations are known and use of each resist independently with a nanoimprint method suggests that these resist configurations are substitutable materials in the nanoimprint art, and (b) Tan suggests the process for use in making compact disks, and Heidari teaches a multilayer resist scheme directed to use in compact discs (Section III, page 3557).

10. **Claim 19** is rejected under 35 U.S.C. 103(a) as obvious over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928) in view of Schneider (Applied Physics Letters, Vol. 77, No. 18, October 2000, pp. 2909-2911). Tan teaches the subject matter of Claim 1 above under 35 USC 102(b). **As to Claim 19**, Tan is silent to the etching and disposing of a magnetic layer in the regions where the resist is absent. However, Schneider teaches that it is known to use a deposition process for a magnetic layer. In combination with the modified method of Tan, the Schneider process would provide magnetic nanodisks as one possible resulting product. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Schneider into the modified method of Tan because Tan suggests the method for use with data structures (Figs. 3 and 4), and Schneider's patterned magnetic material provides a data structure which one would recognize as an alternative to the data pits of Tan.

11. **Claim 22** is rejected under 35 U.S.C. 103(a) as obvious over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928) in view of Davis (2002/0025408). Tan teaches the subject matter of Claim 1 above under 35 USC 102(b), or in the alternative, under 35 USC 103(a). **As to Claim 22**, Tan is silent to the thermosetting resist. However, Davis teaches a thermoset resist ([0053]). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Davis into that of Tan because (a) Davis suggests that thermoplastic and thermosetting resists are substitutable alternatives, or (b) Tan suggests fabrication of data structures, and Davis provides techniques specifically directed at fabrication of data structures.

12. **Claim 23** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928) in view of Chou (USPN 5956216), Chou (USPN 6309580), and further in view of Chen (USPN 4786564). Tan, Chou ('216), and Chou ('580) teach the subject matter of Claim 7 above under 35 USC 103(a). **As to Claim 23**, Chou ('580) teaches removing the resist film (10:3-24) wherein a pattern of raised zones and recessed zones is formed in the base structure, but Tan, Chou ('216) and Chou ('580) appear to be silent to a continuous layer. However, Chen teaches a continuous layer which is provided as protection for the underlying alloy (7:67-8:7). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chen into that of Tan in order to provide a hard layer to protect the underlying structures.

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13. **Claim 24** is rejected under 35 U.S.C. 103(a) as being unpatentable over Tan (J. Vac. Sci. Technol. B 16(6), Nov/Dec 1998, pp. 3926-3928) in view of Chou (USPN 5956216), Chou (USPN 6309580), Chen (USPN 4786564), and further in view of Davis (2002/0025408). Tan, Chou ('216), Chou ('580), and Chen teach the subject matter of Claim 22 above under 35 USC 103(a). **As to Claim 24**, Tan is silent to the thermosetting resist. However, Davis teaches a thermoset resist ([0053]). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Davis into that of Tan because (a) Davis suggests that thermoplastic and thermosetting resists are substitutable alternatives, or (b) Tan suggests fabrication of data structures, and Davis provides techniques specifically directed at fabrication of data structures.

14. **Claims 1, 2, 8, 11, 12, 18, 22, and 25** rejected under 35 U.S.C. 103(a) as obvious over Davis (2002/0025408). **As to Claim 1**, Davis teaches a method comprising:

heating a stamper and a resist film ([0073] and [0074]);
imprinting the stamper into the resist film ([0076]);
separating the stamper from the resist film ([0076]);
cooling the resist film after separating (inherent in that other operations are subsequently performed).

Davis does not explicitly teach "separating the stamper from the resist film before there is any substantial cooling of the resist film". However, this limitation would have been prima facie obvious over Davis' teachings regarding the mold and resist temperatures.

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Regarding the mold, Davis teaches that the mold temperature can be above the glass transition temperature of the material to be embossed ([0073], lines 8-10), preferably within 30C above the glass transition temperature ([0073], lines 10-13), and most preferably within about 10C above the glass transition temperature ([0073]), line 14. Furthermore, by *maintaining* the mold slightly above the glass transition temperature and separately heating the substrate to greater than the glass transition temperature, the embossing cycle time can be reduced by orders of magnitude ([0078]).

Regarding the resist, Davis teaches that the substrate is heated to a temperature between about 5 C or less above the glass transition temperature for crystalline material, and greater than about 5 C above the glass transition temperature for amorphous materials ([0073]). Furthermore, Davis teaches that the substrate can be *maintained* or changed as necessary to enable substrate release ([0075], lines 3-7).

Because the mold is maintained within about 10C above the glass transition temperature and the resist is at a temperature substantially similar to the glass transition temperature (5C or less above the T_g if crystalline, more than 5C above the T_g if amorphous, [0074]), there would not be any substantial cooling of the resist film before separation. Additionally, Davis teaches that the particular temperatures of both the mold and resist represent result-effective variables that should be optimized in order to (1) optimize replication, (2) enable substrate release from the mold, and (3) maintain the integrity of the surface features. Thus, the temperatures of both mold and resist represent result effective variables that should be optimized. See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). **As to Claim 2**, see [0073],

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[0077], [0074], [0078]. **As to Claim 8**, see [0077]. **As to Claims 11 and 12**, see [0073] and [0074]. **As to Claim 22**, see [0053]).

15. **Claims 3-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408) in view of Chou (USPN 5956216). Davis teaches the subject matter of Claims 1 and 17 above under 35 USC 103(a). **As to Claim 3**, Davis appears to be silent to the trenches and plateau areas, but Chou teaches trenches and plateaus (Fig. 8). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chou into that of Davis a) in order to provide a magnetic material adapted for horizontal recording (4:54-64), and b) in order to provide a plurality of discrete elements of magnetic material, and c) because Davis clearly suggests the magnetic materials and method which Chou provides (Davis, par. [0080]). **As to Claim 4**, Chou teaches a substrate (Item 40, Figs. 4A-4D). **As to Claims 5 and 6**, Chou teaches selectively removing the resist film to form a pattern of areas that do not have the resist film thereon (Fig. 4C), and disposing a magnetic layer in the areas that do not have the resist film (Fig. 4D, Item 48).

16. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408). Davis teaches the subject matter of Claim 1 above under 35 USC 103(a). **As to Claim 10**, Davis appears to teach that the mold is maintained at its temperature, and thus would appear to be heated first. See [0078] in particular. However, the claimed order of heating represents a rearrangement in the order of steps, which is generally considered to be prima facie obvious in the absence of unexpected results. Here, it would have been prima facie obvious to

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rearrange the order of steps in order to perform a procuring temperature on the resist ([0066]-[0070]) and to subsequently imprint the preheated resist.

17. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408) in view of Chou (USPN 5956216), and further in view of Chou (USPN 6309580). Davis and Chou ('216) teach the subject matter of Claim 5 above under 35 USC 103(a). **As to Claim 7**, Davis and Chou ('216) appear to be silent to the deliberate etching of the base structure using the patterned resist film. However, Chou ('580) teaches that recesses may be formed in the substrate (Fig. 8 and 10:41-51) using a patterned resist film produced by imprinting (Figs. 1A-1D). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chou ('580) into that of Davis because Davis suggests application of material into the spaces between the resist, and because doing so would mechanically secure the deposited material into the substrate, rather than to the surface.

18. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408) in view Colburn (Solid State Technology, Vol. 44, Issue 7, (July 2001), pp. 67-77). Davis teaches the subject matter of Claim 1 above under 35 USC 103(a). **As to Claim 9**, Davis appears to be silent to the multilayer resist. However, Colburn teaches that bilayer resists are known in nanoimprint lithography (see Fig. 1 and pages 67-68). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Colburn into that of Davis because many resists are known to be used interchangeably

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and are substitutable for each other, and the use of Colburn's resist in the Davis process is merely the substitution of one known nanoimprinting resist for another.

19. **Claims 13-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408). Davis teaches the subject matter of Claim 12 above under 35 USC 103(a). **As to Claim 13**, Davis does not explicitly teach the "close proximity", however, it would have been prima facie obvious to keep the stamper in close proximity to the resist film in order to avoid heat loss during transfer. **As to Claim 14**, Davis appears to be silent to the exact temperatures. However, firstly Davis clearly recognizes that the particular temperatures of the stamper and resist represent result effective variables that the ordinary artisan would have optimized ([0073] and [0074]). See MPEP 2144.05 II and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Additionally, Davis suggests that the substrate (and resist) be heated to about 5 C above the glass transition temperature, and that the stamper should be within about 30 C over the glass transition temperature ([0073] and [0075]). **As to Claim 15**, Davis clearly teaches the resist and mold both be heated to a temperature very close to or at the glass transition temperature. **As to Claim 16**, Davis also teaches an embodiment wherein the resist is at a temperature slightly above the glass transition temperature, and the stamper is slightly below the temperature of the resist ([0073] and [0075]).

20. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408) in view Colburn (Solid State Technology, Vol. 44, Issue 7, (July 2001), pp. 67-77). Davis teaches the subject matter of Claim 1 above under 35 USC 103(a). **As to Claim 18**,

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Davis appears to be silent to providing a substrate prior to heating. However, Colburn teaches that a polymeric material may be provided on a substrate, and embossed, wherein the providing a substrate would obviously occur (Fig. 1) prior to heating. It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Colburn into that of Davis because one would have found the Davis process obviously applicable to patterning resists as well as patterning of polymeric layers in view of Colburn's disclosure of a similar structure and embossing process.

21. **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408) in view of Chou (USPN 5956216). Davis teaches the subject matter of Claim 1 above under 35 USC 103(a). **As to Claim 19**, Chou teaches selectively etching the resist film to form areas above the base that do not have the resist film thereon (Fig. 4C) and disposing a magnetic layer above the base layer in the areas that do not have the resist film (Fig. 4D). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chou into that of Davis because Davis clearly suggests the method for magnetic media ([0052]), which is what Chou provides.

22. **Claims 23 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Davis (2002/0025408) in view of Chou (USPN 5956216), Chou (USPN 6309580), and Chen (USPN 4786564). Davis, Chou ('216), and Chou ('580) teach the subject matter of Claim 7 above under 35 USC 103(a). **As to Claim 23**, Chou ('580) teaches removing the resist film (10:3-24) wherein a pattern of raised zones and recessed zones is formed in the base structure, but Davis,

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Chou ('216) and Chou ('580) appear to be silent to a continuous layer. However, Chen teaches a continuous layer which is provided as protection for the underlying alloy (7:67-8:7). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Chen into that of Davis in order to provide a hard layer to protect the delicate magnetic structure. **As to Claim 24**, Davis teaches a thermoset resist ([0053]).

Response to Arguments

23. Applicant's arguments filed 31 October 2008 have been fully considered but they are not persuasive. The arguments appear to be on the following grounds:

a) Krauss discloses exactly the opposite of the claimed invention, and lines 10-12 disclose what Krauss did not do.

b) Claim 1 has been amended to recite that the stamper is flat. Tan does not anticipate this limitation, and Claim 1 is nonobvious over Tan because (a) there is no recognized result, and (b) Tan's mere recitation of a temperature range of 120 to 200 C does not provide a basis to achieve any recognized result absent some response characterization. Tan's process has little applicability to a flat stamper.

c) (page 9) The Examiner's inference with respect to Claim 10 and Claim 11 of the Davis reference are wholly irrelevant to the determination of patentability of the present claims. Patentability is dependent on a determination of what is disclosed in the prior art, not the scope of the claims in a reference. There are no particular results which are result-effective in the Davis reference.

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d) A supplemental declaration is provided. The fact that some experiments worked better than others is not a basis for inferring what results were unexpected.

24. These arguments are not persuasive for the following reasons:

a) It is submitted that Krauss did perform the process described on page 83 of the reference at lines 10-12 since the reference sets forth particular results in terms which are not speculative. It is submitted that “resulted in the PMMA flowing” is not ambiguous in this respect. Since the instant invention does not appear to require that the resist film replicates the stamper surface (See Claim 1), the rejection over Krauss is maintained.

b) The Tan roller, even when bent into a cylinder, would be locally flat. With respect to the alleged failure of Tan to provide a recognized result, it is respectfully submitted that conformance of the resist to the pattern of Tan is the recognized result, and that the resist would have inherently or obviously been above the glass transition temperature of the resist in view of the fact that the resist deforms to conform to the template. See Figs. 3 and 4. Since Tan provides roller temperatures which appear to exceed the glass transition temperature of PMMA even at the lower end of the disclosed range, when the resist is in contact with the Tan roller, it would implicitly reach the claimed temperature range. Additionally, the new limitation also does not overcome the Krauss reference set forth in the other rejection of Claim 1. Claim 1 does not require replication of the stamper features in the cooled resist, but merely a step of imprinting and removing above a particular temperature.

c) Applicant appears to have raised the issue of patentability of the claimed invention with respect to Claim 11 of Davis. See page 9 of the reply filed 11 February 2008. In the Davis

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process, Claim 10 provides a step of “cooling said compressed substrate”, and Claim 11 adds only one additional limitation, namely that the compressed substrate is cooled to below the glass transition temperature. One of ordinary skill in the art is a person of ordinary creativity, not an automaton. “[I]n considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.” *In re Preda*, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). It is submitted that the inference argued against is valid, particularly when read in light of the Davis specification.

d) The Examiner respectfully maintains that the declaration does not meet the nexus requirement. The claimed invention appears to be drawn to removal of the stamper from the resist at any temperature greater than the glass transition temperature. Claim 1 does not require that the resist replicates the surface features of the stamper. Thus, replication of surface features cannot be relied upon as an unexpected result. Imprints which suffer from complete reflow as a result of excessive stamper removal temperatures would also appear to be within the scope of Claim 1. As Krauss indicates (page 83), such a process is conventional and anticipated in the art even if the result is undesirable. Even if replication of the surface features were to be claimed, such replication would not be achieved at every temperature. The declarations filed under 37 CFR 1.132 both appear to admit that the stamper removal temperature is critical to the replication of surface features, the asserted unexpected result.

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Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571)272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Matthew J. Daniels/
Primary Examiner, Art Unit 1791
1/18/09